

WE CLAIM:

1. A system for hybrid electronic/photonic switching of traffic in a node of a communications network, the system comprising:
  - a plurality of interfaces adapted to translate respective traffic streams between corresponding electronic and optical signals;
  - an electronic cross-connect (EXC) adapted to selectively map an electronic signal through a selected one of the interfaces; and
  - a photonic cross-connect (PXC) adapted to selectively couple an optical signal between the selected interface and a selected one of at least two optical channels of the communications network.
2. A system as claimed in claim 1, wherein the plurality of interfaces comprises at least one working interface and at least one protection interface.
3. A system as claimed in claim 2, wherein a number of working interfaces corresponds with a number of working channels of the communications network.
4. A system as claimed in claim 3, wherein each working interface is adapted to translate between an electronic signal and a corresponding optical signal having a substantially fixed predetermined wavelength.
5. A system as claimed in claim 4, wherein the predetermined wavelength is determined during

provisioning of the interface in accordance with a design of the communications network.

6. A system as claimed in claim 5, wherein the predetermined wavelength corresponds with a channel wavelength of at least one working channel of the network.
7. A system as claimed in claim 4, wherein at least one working interface comprises a narrow-band laser adapted to generate an optical signal having the predetermined wavelength.
8. A system as claimed in claim 4, wherein at least one working interface comprises a tunable laser adapted to generate an optical signal having the predetermined wavelength.
9. A system as claimed in claim 2, wherein a number of protection interfaces is selected based on a probability of failure of a working interface.
10. A system as claimed in claim 9, wherein each protection interface is adapted to translate between an electronic signal and a corresponding optical signal having a selected wavelength.
11. A system as claimed in claim 10, wherein the selected wavelength is dynamically selected from a set of channel wavelengths of the network.
12. A system as claimed in claim 10, wherein each protection interface comprises either one or both of:

- a wide-band optical detector adapted to detect an optical signal having a wavelength corresponding to any channel wavelength of the network; and a laser adapted to generate an optical signal having the selected wavelength.
13. A system as claimed in claim 12, wherein the laser is a narrow-band laser adapted to generate an optical signal having the selected wavelength.
14. A system as claimed in claim 4, wherein the laser is a tunable laser adapted to generate an optical signal having the predetermined wavelength.
15. A system as claimed in claim 1, further comprising a control system adapted to control operation of the plurality of interfaces, the EXC and the PXC.
16. A system as claimed in claim 15, wherein the control system comprises:
- a first detector adapted to detect a failure of a working interface;
- a selector adapted to select a protection interface for translating the respective traffic stream of the failed working interface;
- an EXC controller adapted to control the EXC to re-map the respective electronic signal of the traffic stream through the selected protection interface; and
- a PXC controller adapted to control the PXC to couple the respective optical signal of the traffic stream between the selected protection interface

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and a respective optical channel through which the traffic stream is being conveyed.

17. A system as claimed in claim 16, wherein the control system further comprises a tuner adapted to tune the selected protection interface to the predetermined wavelength of the failed working interface.

18. A system as claimed in claim 15, wherein the control system comprises:

a second detector adapted to detect a failure of a working channel of the communications network;

a second selector adapted to select an alternate optical channel through which a traffic stream being conveyed by the failed channel can be carried; and

a PXC controller adapted to control the PXC to couple the respective optical signal of the traffic stream between the selected interface and the selected alternate optical channel.